

Application No. 10/522,534
Amendment Dated May 23, 2006
Reply to Office Action of February 23, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A laser bruting machine, comprising:
 - a diamond holder;[.,.]
 - a setup device and a processing device, each being adapted to receive the diamond holder;
the diamond holder including a stitching die, a magnetic die and a rough diamond, a stitching die adapted to receive the rough diamond, and a magnetic die adapted to receive the stitching die;
the setup device centers the rough diamond and the stitching die on the magnetic die with including a computer numerical control (CNC) interface[.,.] and a video system; and
the processing device cuts the rough diamond and including includes a CNC interface to position the rough diamond, a heat exchanger to control temperature of the processing device, a video system to view operation of the processing device, a beam delivery mechanism to deliver a laser beam to the rough diamond, a laser source to generate the laser beam, a radio frequency (RF)-Q Switch driver to control operation of the laser source, a power supply and a stabilizer to control operation of the heat exchanger.
2. (currently amended) A laser bruting machine as claimed in claim 1, wherein a rough diamond is stitched on top of the stitching die by adhesive and heat; and the stitching die and the rough diamond are fixed on top of the magnetic die.

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3. (currently amended) A laser bruting machine as claimed in claim 1, wherein
the CNC interface of the setup device has includes
a motorized X axis positioner, a motorized rotatable platform, and a
motorized up and down positioner to move the diamond holder
received by the setup device;[[],]
drive cards to drive the motorized X axis positioner, the motorized
rotatable platform and the motorized up and down positioner;[[],]
a control card to control movement provided by the drive cards;[[],]
a computer in which the control card is disposed [[16]];[[],]
a monitor connected to the computer;[[],]
limit switches to sense home and end positions of the motorized X axis
positioner, the motorized rotatable platform and the motorized up and
down positioner;[[],] and
three stepper motors;
a drive card power supply to supply power to the drive cards of the setup
device.
4. (currently amended) A laser bruting machine as claimed in claim 3, wherein
each of the motorized X axis positioner, the motorized rotatable platform, and the
motorized up and down positioner are is driven by a stepper motors; and
the diamond holder is rotated by the motorized rotatable platform and takes a
position on the X axis.
5. (currently amended) A laser bruting machine as claimed in claim 4, wherein
one end of each of the drive cards is connected to the motorized X-axis positioner,
the motorized up and down positioner and the motorized rotatable platform,
respectively, and the other end of each of the drive cards is connected to the
drive card of the computer through a pin connector[[;]] and the drive cards are
connected to the drive card power supply.

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6. (currently amended) A laser bruting machine as claimed in claim 5, wherein motion of the motorized X axis positioner, the motorized rotatable platform, and the motorized up and down positioner is controlled by the drive control card disposed in the computer; ~~and limit switches are provided to each end of the motorized X axis positioner, the motorized rotatable platform, the motorized up and down positioner to sense home and end positions.~~
7. (currently amended) A laser bruting machine as claimed in claim 1, wherein the video system of the setup device is connected to the computer and has an upper charge-coupled device (CCD) camera and a lower CCD camera, both cameras being connected to the computer.
8. (currently amended) A laser bruting machine as claimed in claim 3, wherein the CNC interface of the processing device ~~has includes~~
a motorized Y-axis positioner, a motorized rotatable platform, and a motorized X axis positioner to move the diamond holder received by the processing device;
a computer in which control cards are disposed;
a monitor connected to the computer;
a closed circuit television (CCTV) connected to the computer;
a Y drive card, an X drive card, and an R drive card to drive the motorized Y-axis positioner, the motorized rotatable platform, and the motorized X axis positioner;
a drive card power supply to supply power to the drive cards of the processing device; and
three stepper motors to supply power to the motorized Y-axis positioner, the motorized rotatable platform, and the motorized X axis positioner; [
and]
a control card.

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9. (currently amended) A laser bruting machine as claimed in claim 8, wherein the motorized Y-axis positioner, the motorized rotatable platform, and the motorized X axis positioner [[31]] are driven by the stepper motors and controlled by the computer.
10. (currently amended) A laser bruting machine as claimed in claim 9, wherein one end of the Y drive card, the R drive card and the X drive card 34 are connected to the motorized Y-axis positioner, the motorized rotatable platform and the motorized X axis positioner, respectively; and the other end of the Y drive card, the R drive card, the X drive card are connected to the control card of the computer through a pin connector;[[,]] and the Y-drive card, the X drive card, and the R drive card [[35]] are connected to the drive card power supply.
11. (currently amended) A laser bruting machine as claimed in claim 8, wherein motion of the motorized Y-axis positioner, the motorized rotatable platform, and the motorized X axis positioner are controlled by the control card of the computer.
12. (currently amended) A laser bruting machine as claimed in claim 8, wherein displacement of the rough diamond of the diamond holder via the motorized rotatable platform on the Y-axis and the X-axis is accomplished by the motorized Y-axis positioner and the motorized X-axis positioner, respectively,[[;]] the motorized Y-axis positioner and the motorized X-axis positioner are being mounted in such a way that the motorized Y-axis positioner travels on the motorized X-axis positioner.
13. (previously amended) A laser bruting machine as claimed in claim 8, wherein limit switches are provided to each end of the motorized Y axis positioner, the motorized X axis positioner and the motorized rotatable platform to sense the home and end positions.

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14. (currently amended) A laser bruting machine as claimed in claim 1, wherein the video system of the processing device is connected to the computer and has an upper charge-coupled device (CCD) camera and a lower CCD camera, both cameras being connected to the computer.
15. (currently amended) A laser bruting machine as claimed in claim 1, wherein the heat exchanger of the processing device is connected to the power supply of the processing device and to the FRQ-switech RF Q-switch drive; the digital temperature controller and light emitting diodes (LED's) of an interlock controller for flow, level [[&]] and temperature indication of de-ionized water, the pump on and off knob, and the pump LED are accommodated in the heat exchanger.
16. (currently amended) A laser bruting machine as claimed in claim 15, wherein the heat exchanger has a cooling system [[37,]] and a chilling system [[38]], the cooling system circulates de-ionized water while the chilling system circulates water; the cooling system in port of the heat exchanger is connected to one end of a Teflon connector via hose pipe while the other two ends of the Teflon connector are connected to an out port of a laser head and the an out port [[77]] of the a Q-switch via hose pipes, respectively; an out port of the heat exchanger is connected to one end of the Teflon connector via the hose pipe while the other two ends of the Teflon connector are connected to the an in port of the laser head and the an in port of the Q-switch via hose pipes respectively; the chilling system has a chilling pump system[[;]], the chilling pump system has having a split tank[[,]] and a chilling water tank; the digital temperature controller is connected to the chilling water tank; the chilling out port and the chilling in port of the heat exchanger are connected to the chilling pump system;

the chilling out port of the heat exchanger is connected to ~~the an~~ in port of the chilling water tank via [[the]] hose pipe and ~~the an~~ out port of the chilling water tank is connected to ~~the an~~ in port of the split tank [[71]] via ~~a~~ hosepipe [[96]];

~~the an~~ out port of the split tank is connected to ~~the a~~ dual port of the chilling water tank via ~~the~~ hose pipe and the other end of ~~the~~ dual port of the chilling water tank is connected to the chilling in port [[94]] of the heat exchanger via hose pipe.

17. (currently amended) A [[novel]] laser bruting machine as claimed in claim 1, wherein a beam delivery mechanism of the processing device has a bruting process system and a girdle polishing system;

the bruting process system includes

a sliding beam bender;

a lower beam bender receiving the laser beam from the sliding beam bender; and

a lower focusing device that receives the laser beam from the lower beam bender and focuses the laser beam on the diamond; and

the girdle polishing system includes

an upper beam bender; and

an upper focusing device that receives the laser beam from the upper beam bender and focuses the laser beam on the diamond.

18. canceled

19. (currently amended) A laser bruting machine as claimed in claim [[18]] 17, wherein ~~the girdle polishing system has an upper beam bender [[59]] and an upper focusing device;~~

the sliding beam bender, the lower beam bender and the upper beam bender are placed at substantially 45° with respect to the incoming laser beam,[[;]] each of the beam benders bends the laser beam substantially 90°;

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the lower focusing device and the upper focusing device focuses the incoming laser beam; and

the lower focusing device and the upper focusing device have an illuminating source to illuminate the rough diamond,[[;]] each illuminating source of the lower focusing device and the upper focusing device ~~have has~~ a plurality of light emitting diodes (LED's).

20. (currently amended) A laser bruting machine as claimed in claim 1, wherein the laser source ~~has~~ includes
 - a laser head to generate a laser beam;
 - a back mirror to amplify the laser beam by providing feedback; [[,]]
 - apertures to restrict light amplification; [[,]]
 - a Q-switch to store laser beam energy; [[,]]
 - a laser head,
 - a shutter to block the laser beam path; [[,]]
 - a polariser polarizer to polarize the laser beam; [[,]]
 - a front mirror [[46]] to amplify the laser beam by providing feedback; and
 - a beam expander to minimize divergence of the laser beam.
21. (previously amended) A laser bruting machine as claimed in claim 1, wherein the RF Q Switch driver is connected to the computer, the Q-Switch and the heat exchanger.
22. (currently amended) A laser bruting machine as claimed in claim 1, wherein
 - a the stabilizer is connected to the power supply; and
 - a T.P. test point switch, a laser lamp on and off toggle switch, a current setting unit, a push button on and off switch of the current setting unit, and a current variable knob are connected to the power supply.
23. (currently amended) A laser bruting machine as claimed in claim 8, wherein the computers are connected by a local area network LAN.

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24. (new) A laser bruting machine as claimed in claim 3, wherein
the limit switches are provided to each end of the motorized X-axis positioner, the
motorized rotatable platform, the motorized up and down positioner to sense
home and end positions.

25. (new) A laser bruting machine as claimed in claim 3, wherein
the drive card power supply is connected to the drive cards to switch on and off
the drive cards.